FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM

No. 693. (No. 14, Vol. XIV.) APRIL 6, 1922 [Weekly, Price 6d. Post free, 7d.

Flight,

The Aircraft Engineer and Airships

Editorial Offices: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2
Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828

Annual Subscription Rates, Post Free:
United Kingdom .. 30s. 4d. Abroad 33s. 0d.*

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates

* *European subscriptions must be remitted in British currency*

CONTENTS

	PAGE
Editorial Comment	
The New Airship Scheme	197
The Ships to be Used	198
The Projected Route	198
Can It be Done?	198
The Resignation of General Sykes	198
London-Continental Services	199
Resignation of Sir Frederick Sykes	199
London Terminal Aerodrome	200
Royal Aero Club Official Notices	201
The Lisbon to Rio Transatlantic Attempt	202
Nice Meeting	202
Airship Services	203
The Design of a Commercial Aeroplane	204
Improving the Air Port Services	206
London-Paris British Air Service	207
London Aero-Models Association	208

DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

1922.	
April 6	**Lecture, "Aerodynamical Efficiency," by M. Louis Breguet, before R.Ae.S.**
April 7	**Lecture, "Some Outstanding Problems in Aeronautics," by Professor L. Bairstow, before Students' Section, R.Ae.S.**
April 17	**R.Ae.C. Race Meeting, at Waddon**
April 17–19	**Seaplane Contest, Marseilles**
June 1	**Entries close for Schneider Cup Race**
June 5	**R.Ae.C. Easter Race Meeting, at Waddon**
June 23–25	**International Competition for Touring Aeroplanes, Brussels**
July 6–20	**French Gliding Competition**
Aug. 6	**Gordon-Bennett Balloon Race, Geneva**
Aug. 7	**R.Ae.C. Race Meeting, at Waddon**
Aug. (last fortnight)	**Schneider Cup Seaplane Race, at Naples**
Sept.	**Tyrrhenian Cup, Italy**
Sept.	**Italian Grand Prix**
Sept. or Oct.	**R.Ae.C. Race Meeting, at Waddon**
Sept. 22 ...	**Coupe Deutsche (800 kil.)**
1923.	
Dec. 1	**Entries Close for French Aero Engine Competition**
1924.	
Mar. 1	**French Aero Engine Competition.**

INDEX FOR VOL. XIII.

The Index for Vol. XIII of FLIGHT (January to December, 1921) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 1s. per copy. (1s. 1d. post free).

EDITORIAL COMMENT



FOLLOWING as it did so closely upon the announcement of the handing over to the Disposals Board of all airships and airship material, the news of the very serious attempt to form a company for the carrying out of an airship mail and passenger service to India and Australia probably came as a surprise to most people. It was generally thought that, what with South Africa and then India turning down the airship proposition, the whole question was deferred till better times. The new scheme, having the backing of such very solid and influential firms as Vickers and the Shell motor spirit group, is a welcome sign of faith in the future of the airship.

The New Airship Scheme

With reference to the scheme, which is briefly indicated elsewhere in this issue, this calls for a total capital of £4,000,000, which is not by any means an unduly large amount wherewith to start a service to the other side of the world. It will be noticed that no capital outlay is asked for from the Government, but merely a contingent liability, in the form of a guarantee of interest, of £91,000 per annum until such time as the undertaking is able to pay the interest itself. This period is estimated by experts at four to five years. It is proposed that India and Australia should undertake a similar guarantee of interest, but only to the extent of £40,000 each, or amounts which are thought to correspond with the benefits to be derived from the services by the three countries.

In view of the fact that, as Maj. Scott stated at the recent Air Conference, we shall be forced to take up airships again in a few years' time whether we like it or not, a fact which has not been disputed, it would seem that the Government cannot well turn down this proposal, which would have the effect of creating a commercial airship service which could not fail to be of the greatest importance as a reserve in *personnel* and *matériel* against an emergency. Even in the event of the Governments having to hand over the

entire guarantees of £171,000 per annum, the price would be a small enough one to pay for the benefits, from an Imperial point of view, of such services.

It should not be forgotten that the starting of such an airship service would have an accumulative effect on commercial aviation in general, because once the airship service was started, branch or feeder lines operated with aeroplanes or seaplanes would be established almost at once. In this way a network of aerial routes would come into being, which would be of the most far-reaching importance as an item in Imperial defence. If we are to have "all-red" air routes to different parts of the Empire, it is difficult to see how one can leave out the airship, which is the long-distance aircraft *par excellence*. On the other hand, once the greatest distances between parts of the Empire are linked up by airships, the development of heavier-than-aircraft services within the Dominions and Colonies will follow as a matter of course.

At the moment of writing the Air Council has not announced its views in this matter, but we really cannot see on what grounds it could refuse its co-operation. The handing over of existing airships and material would certainly not mean a great loss to the nation, as the ships and equipment would not be likely to fetch very much as scrap. On the other hand, although existing ships would be useless for the service, they would form a very good fleet for training and similar purposes. A further point for the Government to consider is that the saving in dole money by reason of the building of new airships might easily exceed the amount of the interest they are asked to guarantee.

◆ ◆ ◆

The Ships to be Used

With regard to the airships which it is proposed to build for the projected services, these appear to us somewhat ambitious. It is now generally admitted that before we can with certainty and safety build ships larger than 2,500,000 cubic ft. further research is necessary. It is a big jump from 2,500,000 cubic ft. to 3,800,000 cubic ft., and if the Government agrees to the suggested scheme, it might be advisable to use one or two of the existing airships for purposes of full-scale research, of which, we believe, not a very great amount is required in order to establish certain fundamental principles in design. Failing this, we are afraid that the construction of an airship of close on four million cubic feet will be somewhat of an experiment, and might easily prove a very expensive one. If the airship service is to be a success it is of the utmost importance that public confidence should not be shaken at the beginning by any untoward incident.

◆ ◆ ◆

The Projected Route

It is expected that the new large airships will be capable of a speed of 70 knots, but as stops have to be made *en route*, and an allowance of six hours at each mooring mast has been made, the average speed has been put at the conservative figure of 40 knots. This would mean that the journey to Bombay would occupy 5½ days, as against the present 17 days. Rangoon, instead of being 22 days from London, would be brought within 7½ days. Hong Kong should be reached in 8½ days—it now takes about 4½ weeks; and Perth, in Australia, should be within 11 or 12 days of London. This represents in the case of Perth a saving of between a fortnight and three weeks, and by the time overland air services by aeroplanes had been established Southern Australia should be brought correspondingly nearer to London. The gain in time over the whole route is such that both for mails and passengers there should be no lack of public support of the scheme, quite apart from any consideration of the advantages from the point of view of Imperial defence.

◆ ◆ ◆

Can It be Done?

We have already referred to the fact that we do not consider it possible to build airships of close upon four million cubic feet until further research has been made, and have suggested that one or two of the existing airships should be used for research on full scale. There is another item in the scheme which appears to us somewhat doubtful. It has been stated that the new airships can be built at a cost of £125,000 to £150,000. Where? Certainly not in this country. We presume it is not intended to buy the ships from Germany, and the possibility of building a ship of 3,800,000 cubic ft. capacity for £150,000 in this country is, it seems to us, very much open to doubt. Germany during the War had exceptional production facilities—turning out, we believe, a complete rigid airship in something like two months. Even then the cost of a ship was generally admitted to be approximately £250,000, and the ships then built were certainly very much smaller than the type contemplated for the new airship service. However, even if the cost should exceed the suggested figure, improvements are in sight which will materially reduce the running costs. One of the chief among these is the use of hydrogen, in conjunction with petrol, as fuel. It has been estimated that this will increase the paying load by 40 per cent. In the estimates placed before the Dominion Premiers the production of hydrogen was taken as costing 20*s*. per 1,000 cubic ft., whereas with modern methods it is thought that this can be reduced to about 4*s*. per 1,000 cubic ft. There are other improvements which may reasonably be counted upon within the next few years, and so probably the estimated figures of costs will prove somewhere near the mark, even if the relative amounts of the different items may have to be given a somewhat different allocation.

Taking everything into consideration, we think the proposed scheme deserves every support, and we hope—even if it demands certain modifications in detail—the Air Council will decide to support the scheme somewhat in the manner suggested.

◆ ◆ ◆

The Resignation of General Sykes

On another page of this issue of FLIGHT will be found copies of the correspondence which passed between Maj.-Gen. Sir Frederick Sykes and Capt. Guest, referring to the resignation of the former as Controller-General of Civil Aviation on the expiration of his term of office. It had been thought that Sir Frederick would accept the offer of the Secretary of State for Air to remain in office for another year, but this he has now declined to do, and his resignation has been accepted.

It has been alleged in certain quarters that the present state of civil aviation was due to Sir Frederick's handling of the Government's side of it. With that view we have never agreed, and that civil aviation fell on evil days was due to the Treasury limitations imposed upon the department rather than to any fault on the part of the Department itself. They had to administer a policy, but were not to blame

for that policy, and in the administration of it we think it will be agreed by every one who has had anything to do with the C.G.C.A. that very great sympathy and courtesy has always been shown. We do not know what plans Sir Frederick Sykes has for the future, but we do desire to express to him our thanks for his conscientious work in the Civil Aviation Department, and wish him all good luck in whatever direction he may decide to apply his great gifts as an organiser.

So far no successor to Sir Frederick Sykes has been appointed, and it is doubtful whether any will be appointed. Rather do we expect that the office will be allowed to lapse—at any rate, in its present form. Capt. Guest, in his remarks introductory to the Air Estimates debate, outlined a scheme of reorganisation of the administrative side of the Air Ministry. Probably now that Sir Frederick has resigned, the department of Civil Aviation will be placed, not under a Controller-General, but under a Director, possibly with the title Director of Civil Aviation. If that prove to be the intention of the Government, we trust that the new D. of C.A. will be given a seat on the Air Council, as otherwise there would appear to be a danger of Civil Aviation becoming too much of a sub-department of the service side of aviation.

◈ ◈ ◈ ◈

RESIGNATION OF SIR FREDERICK SYKES

The Air Ministry announced on April 1 that Maj.-Gen. Sir Frederick Sykes, G.B.E., K.C.B., C.M.G., has resigned his appointment as Controller-General of Civil Aviation, on the expiration of the term for which he was originally appointed.

The following correspondence has passed between the Secretary of State for Air and Sir Frederick Sykes :—

Air Ministry, *March* 29, 1922

Dear Guest,

I thank you for your invitation to continue in my position as Controller-General of Civil Aviation for another year. This invitation was conveyed to me in a letter received late on Monday night (the 20th inst.) and it was necessary for me to give a decision before your statement in the House of Commons on Tuesday (the 21st). I had, therefore, very little time for consideration, and, as I intimated to you on Tuesday the 21st, I was prepared, because of my keen interest in the air, to accept it. On reconsideration, however, I have now come definitely to the conclusion that, owing to the very small scale to which you have found it necessary to reduce the Department of Civil Aviation, there is no scope for such a position as mine, and that I would not be justified in continuing even for a year to receive a salary for work which circumstances make it impossible for me to perform. I desire, therefore, that my appointment should terminate on April 1—the date originally fixed, but if you think that I can be of assistance in connection with the re-organisation which you contemplate, I shall gladly place my services at your disposal in a voluntary capacity.

Yours sincerely,
(Signed) F. H. Sykes

Capt. The Right Hon. F. E. Guest, D.S.O., M.P.,
Secretary of State for Air.

Air Ministry, Adastral House,
March 31, 1922

Dear Sykes,

I am in receipt of your letter of March 29, in which you tender me your resignation of the post of Controller-General of Civil Aviation, on the expiration of your original three years' term of office on April 1.

I feel that your action, prompted as it is by an appreciation of the position of the national finances, which have forced us to curtail the activities and the expenditure on your, as well as on other Departments, is entirely honourable to yourself.

I greatly regret that our association on the Air Council and in the Air Ministry, should now terminate, but I do not hesitate to accept your decision.

I know how deep your interest in your work has been, and what it must mean to you to leave it, but you have the satisfaction of knowing that the ground work of the Air Ministry's plans in regard to Civil Aviation has been well laid. I am confident that both the Air Ministry and the public will remember your services with gratitude.

In my own name and on behalf of my colleagues, I wish to thank you, and to express the hope that your departure from the Air Ministry will not impair your interest in the Air Force and in Civil Aviation, in the auguration of both of which you have played so large and so distinguished a part.

It is good of you to offer your voluntary services in connection with the re-organisation which I outlined in the House of Commons last week, and I shall certainly be very glad to avail myself of your offer, as opportunity arises.

Yours sincerely,
(Signed) Frederick Guest

Maj.-Gen. Sir F. H. Sykes, G.B.E., K.C.B., C.M.G.

◈ ◈ ◈ ◈

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN MARCH 19 AND APRIL 1, INCLUSIVE

Route‡	No. of flights*	No. of passengers	No. of flights carrying Mails	No. of flights carrying Goods	No. of journeys completed†	Average flying time	Fastest time made by	Type and (in brackets) Number of each type flying
						h. m.		
Croydon-Paris	54	134	16	39	52	2 33	D.H. 18 G-EAWW (1h. 57m.)	B. (5), Br. (1), D.H. 4 (2), D.H. 18 (3), G. (5), H.P. (1), V. (1).
Paris-Croydon	54	155	9	39	46	3 24	D.H. 4a G-EAWH (2h. 9m.)	B. (6), Br. (1), D.H. 4 (2), D H. 18 (2), G. (5), H.P. (2), V. (1).
Totals for 2 weeks ...	108	289	25	78	98			

Note : One flight (1 pass.) between Croydon–Amsterdam made on 13th.

* Not including "private" flights. † Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T. D.H.4 = De Havilland 4, D.H.9 (etc.).
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. M. = Martinsyde. N. = Nieuport.
P. = Potez. R. = Rumpler. Sa. = Salmson. Se. = S.E.5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

The following is a list of firms running services between London and Paris, Brussels, etc., etc. :—Co. des Grandes Expresses Aériennes; Daimler Hire Ltd.; Handley Page Transport, Ltd.; Instone Air Line; Koninklijkie Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

LONDON TERMINAL AERODROME

Monday evening, April 3.

PARTICULARLY changeable weather has marked the past week. There have been snowstorms, gales, and ideal flying days so hopelessly mixed as to prevent anything like regularity of service. On Thursday snowstorms were experienced all the way from Northern France to Croydon, and pilots had great difficulty in getting through. One of the Messageries' Breguets had a particularly rough time. The pilot of this machine, which was *en route* from Paris to Croydon, saw a large snowstorm right in his track when approaching Boulogne, and in order to avoid this he struck out over the sea at Paris-Plage. The snow was so heavy, however, that he completely lost his way, and it was only by good fortune that he eventually found himself over the coast near Lympne, after flying above the water for nearly an hour—during which time he was forced down occasionally to within 30 ft. of the sea by low clouds. He landed at Lympne for weather reports, and then flew on to Croydon, having to pass through a snowstorm on his way.

Mr. Olley, flying a Handley Page 0-400, had to land at Lympne and Biggin Hill before finally reaching Croydon.

The pilot of the Instone machine got through without a stop, but was greatly troubled by the "smoke barrage." This "barrage" is encountered whenever the prevailing wind is from the north or north-west, and consists of smoke and other atmospheric impurities which are carried over Surrey and Kent from London. On this particular occasion it had drifted as far as 4 miles out into the Channel, and persisted all the way to Croydon. It produces an effect of thick haze, and, although troublesome, seldom actually prevents flying.

Today, again, there was stormy weather with heavy snow in England, and copious rain in France, and the entire service was suspended. It was extremely unfortunate that this should happen today as two new services, both advertised widely, were to have begun. The Messageries Aériennes had arranged for a newspaper "special" to leave Croydon at 7 a.m., and a similar machine with French newspapers was to have left Le Bourget; while the new services instituted by Daimler Airways were also to have been inaugurated.

Advent of the New "Air Expresses"

ON Friday the first of the D.H.34's, which have been eagerly awaited, arrived on the aerodrome from Stag Lane. Mr. Hinchcliffe was piloting the machine, while Mr. Herne was in the seat next the pilot. The aeroplane aroused much interest, and during the day the various pilots of Daimler Airways were getting experience on the machine, and doing the requisite number of landings in order to get the "34" put on their licences.

On Sunday Mr. Hinchcliffe flew the machine to Paris with a load of newspapers. The load was, apparently, too much for the machine, and after an extraordinarily long run it only just managed to clear the hedge, and was actually so low that it disappeared from sight in the valley south of the aerodrome. The flight to Paris occupied 3 hours 18 minutes, and the petrol ran dry on Le Bourget aerodrome; so it would appear that Mr. Hinchcliffe either had trouble with the machine or went a long way out of his course.

When attempting to leave Le Bourget for the return journey, again with a heavy load, the machine stuck in the mud and was unable to get away.

This sort of thing rather amuses the "old hands," as they have all been through it years ago; but it would perhaps be better if new companies could benefit by some of this experience, and start where others have left off, instead of beginning all over again, and making the same mistakes that were made in early days. It will be remembered that the same sort of thing happened with the D.H.18's. For a long time their full load was at the most seven passengers, but when pilots and mechanics had gained experience on the machines the full load of eight passengers and quantities of baggage could be carried with ease.

The Instone Air Line have also had delivery of their first D.H.34, and this made its maiden trip to Paris and back on Sunday with a number of newspaper representatives. There was quite a race, in fact, between the Instone and the Daimler people to get away first. Mr. Barnard piloted the Instone "34," and had the same sort of trouble in taking off, but, having had previous experience of this kind of thing, he "taxied" back and the machine was lightened by two passengers. The second attempt was successful, and he made the trip to Paris in 2 hours 40 minutes. He also made the return journey in fairly good time, but had to land at Lympne for minor adjustments to the engine.

In addition to the "34," the Instone Line sent a "4a" and the "Vimy" to Paris on Sunday, while a D.H.18 returned from Paris, a total of five journeys for the day.

Amsterdam and Back at 4½d. a Mile

MR. LEVERTON informs me that when the K.L.M. re-open their Amsterdam service on the 18th, the fares will be reduced from £8 8s. single to £6 6s., and from £15 15s. return to £10 10s. The return fare is, I believe, the lowest on any of the "airways," working out at a fraction over 4½d. a mile.

The Messageries Aériennes, with the opening of their new office in the Haymarket, have a new London manager, Mr. P. E. Grosfils, and he tells me that his Company are now the general agents in London for many of the airways operating in France, including the line from Paris to Constantinople. His Company are finding their present offices on the aerodrome too cramped, and are to build another just at the entrance to the 'drome.

At the moment there is great rivalry between the different firms for pride of place in both offices and signs; but the Handley Page Company have certainly, up to the present, said the last word with a gigantic sign running along the apex of their new office roof, and visible from all parts of the aerodrome and also from Plough Lane.

Mr. Shaw flew an "18" to Paris on Friday for the Instone Air Line, and encountered bad weather on the way. Near Poix aerodrome, while flying below the level of the tree-tops, he narrowly missed a "Spad" that had forced-landed in a ploughed field on the other side of the road to the aerodrome. Some idea of the weather conditions may be gathered from the fact that the pilot of the "Spad" had been unable to rise high enough to clear the trees, and get into the aerodrome, because of the lowness of the clouds. On Mr. Shaw's return journey the weather was so bad in the Beauvais district that he flew off from Le Bourget due north and then, edging towards Abbeville, flew into clear weather.

The enclosure-side of the aerodrome is a mass of mounds of earth and trenches, where the petrol companies are busily putting in tanks and pipe-lines. When the present schemes are finished, there will be bulk storage for 16,000 gallons of petrol. The Daimler Airway have their own 3,000-gallon tank and pump, so that they will avoid having to wait if they find all the pumps in use. I understand that the mixing of the petrol and benzole for the Napier engines is to be done in this tank, instead of in the tanks of the "34's."

The D.H.18 G-EAWO, which was loaned to the Instone Air Line by the Air Ministry, was handed over to the Daimler Airways yesterday, and riggers from De Havilland's were working late last night fitting new wings to the machine, which has now flown over 600 hours. The old wings are to go back to Stag Lane to be done up.

Mimic Tornado on the 'Drome

ON Friday afternoon there was an amusing and unusual event on the aerodrome. The Royal Aero Club's "Avros" played a leading part, being required to provide a gale of wind for the filming of a scene in a South American tornado by the Welsh-Pearson Company. Fire hydrants, with special sprinkler attachments, were run out to provide the torrential rain, and the hero of the film story struggled in the tempest thus produced. Incidentally, the grassy surface of the aerodrome gave a realistic representation of a South American pampas.

Capt. Muir, of the Surrey Flying Services, tells me that the charges for the hire of that company's "Avros" and D.H.9 for taxi work are to be on the basis of 2s. a mile. As the "9" will take three passengers, this works out at only 8d. per mile per passenger, which is beginning to compare favourably with the rates for ordinary taxis.

The Trust House have now replaced the old settees and easy-chairs with more substantial furniture, upholstered in leather, and the lounge has been the one cosy place on the aerodrome during the inclement weather and biting winds of the past week.

Mr. Pudney, who has bought the Renault-Avro previously owned by Mr. Herne, flew off yesterday ostensibly on a test flight, but apparently finding the machine "O.K." and the weather perfect, made off to an unknown destination.

■ ■ ■ ■

'Planes Assist Seal Catching

A GRAND catch of 50,000 seals is recorded from Montreal as the first week's haul of the Newfoundland Sealing Fleet, which was guided by aeroplanes to the location of the herds.

FLIGHT
AIRCRAFT ENGINEER

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

ANNUAL GENERAL MEETING

THE Annual General Meeting was held at the Club on Wednesday, March 29, 1922. Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., (Chairman of the Club) presided, supported by Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O., Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., Lieut.-Col. Mervyn O'Gorman, C.B., Col. F. Lindsay Lloyd, C.M.G., C.B.E., Mr. F. Handley Page, Mr. Ernest C. Bucknall.

The result of the Ballot for the nine vacancies on the Committee was declared as follows :—

Group-Capt. F. W. Bowhill, G.M.G., D.S.O., R.A.F.
Maj.-Gen. Sir W. S. Brancker, K.C.B., A.F.C.
Ernest C. Bucknall.
G. B. Cockburn.
Col. F. Lindsay Lloyd, C.M.G., C.B.E.
Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P.
Lieut.-Col. Mervyn O'Gorman, C.B.
Air-Commodore C. R. Samson, C.M.G., D.S.O., A.F.C., R.A.F.
Sir A. Mortimer Singer, K.B.E.

Election of President, Vice-President and Council.—The following were unanimously elected :—

President.—Brig.-Gen. the Duke of Atholl, K.T., M.V.O., D.S.O.

Vice-President.—Viscount Northcliffe.

Council

S.A.I. Prince Roland Bonaparte.
The Earl of Hardwicke.
The Earl of Lonsdale.
Admiral of the Fleet, The Earl Beatty, G.C.B., O.M., G.C.V.O., D.S.O.
The Rt. Hon. Lord Hugh Cecil, M.P.
The Lord Howard de Walden.
The Lord Kinnaird, K.T., F.R.G.S., D.L., J.P.
The Lord Montagu of Beaulieu, C.S.I.
Admiral of the Fleet, the Rt. Hon. Sir Edward Seymour, G.C.B., O.M., G.C.V.O.
Admiral The Hon. Sir Edmund Fremantle, G.C.B., C.M.G.
Count Henry de la Vaulx.
Sir David Salomons, Bart.
The Rt. Rev. Bishop Welldon.
Martin Dale.
Andre Michelin.
Sir Basil Zaharoff, G.B.E., G.C.B.
Air-Marshal Sir Hugh M. Trenchard, Bart., K.C.B., D.S.O.

The Chairman, in his statement at the Meeting, said : The Club is the Society for encouragement of the sport of Aviation in this country, and last year the programme of races was carried through successfully. The cost of organising races and provision of prizes fell rather heavily upon the Club ; there was, however, every indication that the general public was prepared to support these races, and it is hoped that this year the expenses would be more than covered.

The Aerial Derby last year produced a very exciting race, and brought to light the Bamel machine, designed by Mr. H. P. Folland and constructed by the Gloucestershire Aircraft Co. The speed of the Bamel machine was 163·34 m.p.h. This machine eventually represented Great Britain in the Deutsch Cup in France, but, owing to a mishap to the fabric, was unable to complete the course. At a later date, the Bamel machine flew at Martlesham Heath, and put up the British speed record over a kilometre course to 196·6 m.p.h.

A new departure last year was the introduction by the Club of an air race between the representatives of Oxford and Cambridge Universities, and the result was a very close finish, ending in a victory for Cambridge. The Club took over the financial responsibilities of supplying the machines. Every effort is now being made to hold a similar race this year.

Another new departure last year was the holding by the Club of the first race meeting at Croydon. In spite of the inclement weather the meeting was a distinct success, and has encouraged the Club to hold further meetings there this year on the same lines. The first meeting will take place on Easter Monday, April 17.

Gordon Bennett Balloon Race was started from Brussels in September last, and the Club's representatives, Mr. Allen and Squadron-Leader Baldwin, occupied the second and fourth places in a field of fourteen competitors. The winner alighted in Ireland, and the two Club representatives in Wales.

Last year the Club acquired four aeroplanes for the use of Members. These are housed at Waddon Aerodrome, Croydon, and are let out to the Members at a very reasonable figure. The Flying Service's Fund is still carrying on its charitable work. During the year 200 applications for assistance were dealt with, and grants and allowances to the amount of £3,109 were made. The Duke of York continued to take a great interest in the Fund, and the other Members of the Committee have also given much time to the administration.

The Annual Conference of the F.A.I. was held last year in Madrid, and was opened by the King and Queen of Spain. Col. O'Gorman, who attended all F.A.I. Conferences on behalf of the Club, had rendered very valuable assistance.

The Racing Committee had worked very hard in carrying out last year's racing programme. They have also prepared this year's programme, which is on a more extensive scale than in previous years.

The Committee of the Club which meet monthly are primarily engaged in the aeronautical work of the Club. Apart from the Club Committee Meetings, individual Members of this Committee render valuable assistance in representing the Royal Aero Club on several Joint Committees outside the Club, such as the Air Ministry, International Conferences, Society of British Aircraft Constructors, the Air League, etc.

He acknowledged with thanks the gift of two pictures of the late Mr. H. G. Hawker and Commander Mackenzie Grieve, painted by Mr. Ambrose McEvoy, and presented to the Club by the Directors of Rolls-Royce, Ltd.

In conclusion it was announced that the Committee had decided to suspend the Entrance Fee temporarily for 100 new members, which it was hoped to elect during the next six months.

COMMITTEE MEETING

A Meeting of the Committee was held on Wednesday, March 29, 1922, when there were present :—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. J. T. C. Moore-Brabazon, M.C., M.P., Lieut.-Col. Mervyn O'Gorman, C.B., Mr. F. Handley Page, Rear-Admiral Sir Godfrey M. Paine, K.C.B., M.V.O., and the Secretary.

Election of Members.—The following new Members were elected :—

Edward Murray Bates.
Lieut.-Col. Maurice Ormonde Darby.
Lieut.-Col. Ivan Buchanan Davson.
Flight-Cadet Ellis Reid.

ROYAL AIR FORCE AND AIR RACING

The Air Council has informed the Royal Aero Club that they have authorised Air Officers Commanding to give permission to Officers and Airmen to take part in Air Race Meetings organised by the Royal Aero Club at Waddon Aerodrome on April 17, June 5, and August 7, subject to the provisions of the King's Regulations.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

France to have a 1922 Aero Salon

IT has now been definitely decided by the Chambre Syndicale des Industries Aéronautiques that they will hold an Aero Exhibition in Paris this year. It will be, as before, at the Grand Palais, and although the actual date is not yet settled, it will probably be in December for a fortnight, although there are many who would prefer September to be the selected month.

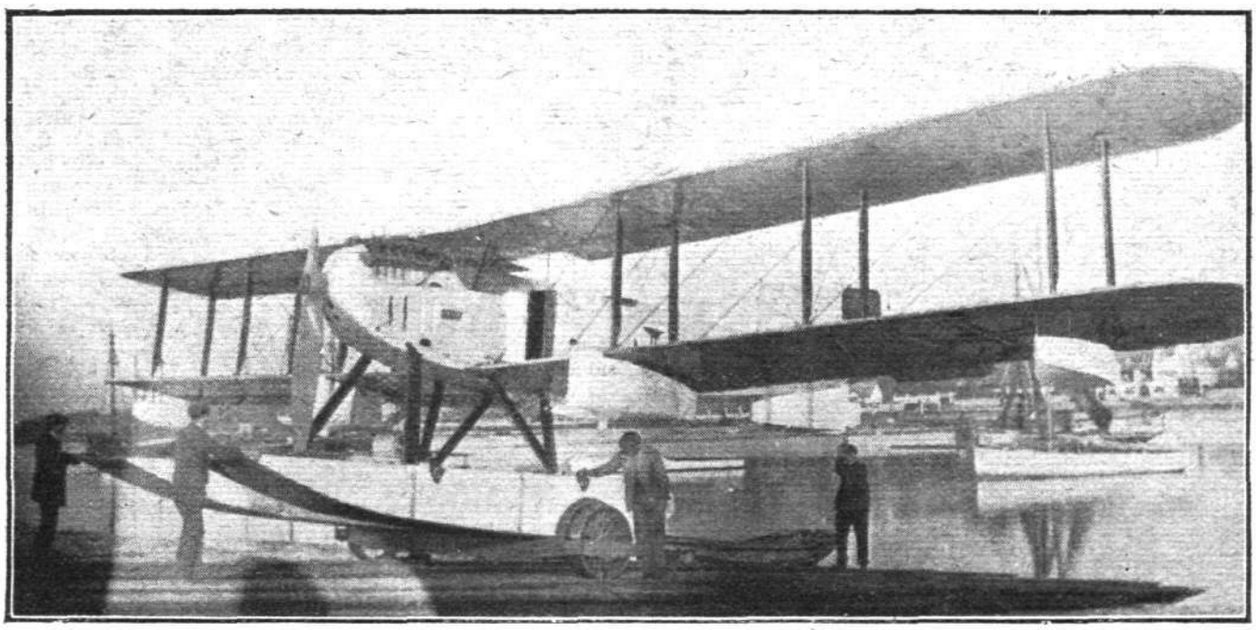
THE LISBON TO RIO TRANSATLANTIC ATTEMPT

Fairey Seaplane Used

Two Portuguese officers, Sacadura Cabral and Gago Coutinho, left the Tagus on the morning of March 30, on their first stage of the flight to Rio, the Canary Islands. The distance from Lisbon is 715 miles, and the machine arrived at Las Palmas at 3 p.m. For various reasons the resumption of the flight on the next stage, to the Cape Verde Islands, was postponed until Sunday, April 2, when the machine took off from Las Palmas at 10 a.m. The distance to St. Vincent is approximately 840 miles, so that the machine should have arrived at about 8 or 10 p.m. on the same day. Up to the time of going to press no news of its arrival has been received, and some anxiety is felt for the safety of the gallant officers.

The machine used in the attempt is a Fairey seaplane, Rolls-Royce "Eagle" engine, and was described and illustrated in our issue of January 19, 1922. In the main it is similar to the famous Fairey type C III D, but larger wings have been fitted in order to enable the machine to carry the fuel necessary for long-distance journeys.

In the accompanying photograph the machine is shown with two large fuel tanks slung under the bottom plane. These have, we understand, been removed, and the bulk of the petrol has been placed in tanks in the floats instead. In this manner a good deal of head resistance has been saved, and the performance correspondingly increased.



THE FAIREY LONG-DISTANCE SEAPLANE USED IN THE TRANSATLANTIC ATTEMPT: Under the lower plane may be seen large petrol tanks. These have now been removed, and tanks fitted in the floats instead. Otherwise the machine remains as shown in the photograph.

Those who know the standard Fairey seaplanes, and their sea and airworthiness, will not be unduly alarmed at the lack of news from the missing aviators, as the machine would be able to ride out a moderate sea in case of a forced descent. At the same time, trouble may have developed which could not be put right by the crew, and in that case it is to be hoped that they will be seen by a passing vessel, of which there should be a good number on the route followed.

AN AVIATION WEEK AT NICE

By D. W. THORBURN

UNDER the auspices of the Areo Club of the Côte d'Azur, and with the active assistance of the various local authorities, an Aviation Week was held at Nice from March 26 to April 2. The proceeds were divided between the Club, the Syndicate of the Sporting Press, and local charities, and attracted some of the largest crowds I have ever seen at any flying meetings. Practically all the machines taking part were land machines, which were housed at an aerodrome specially prepared on the shore at the far western end of the Promenade des Anglais, but the exhibitions and contests took place over the sea in front of the centre of the Promenade, where some hundreds of yards of the Promenade had been enclosed and stands erected.

The fact that the pilots started at a point about 2 miles distant deprived the affair of the element of personal interest usually so characteristic of Hendon gatherings, and also, it must be admitted, seriously interfered with the organisation of the meeting. An elaborate programme had been prepared, but it bore little if any resemblance to what actually occurred, and the time-table was disregarded entirely.

The first day's flying opened with a defile of all the pilots and machines. The leading French aviators took part, among them being Fonck, Fronval, Sadi Lecointe, Madon, Bernard, Boussotrot, Maicon, and Nungesser, while Italy was represented by Brachpapa and Ferrarin, and Belgium by Willy Coppens, well known in London as the Belgian Air Attaché. There was therefore no lack of talent.

A contest for the best figures of eight followed, but interest was seriously distracted by the continual flying of other pilots at the same time. The slow flying race was won by Flachaire on a Spad, his speed being given as 3 kiloms. in 4 mins. 28⅘ secs. A race between Lecointe and Brachpapa over a course of three circuits, resulted in a win for the Italian on his Fiat. The programme, by the way, made no reference to the motors which played so important a part in the proceedings.

Nine machines took part in a competition for the dropping of messages into a marked area, the winner being Becquet, on a Spad. Other demonstrations included a special display of aerial acrobatics by Fronval and Nungesser.

The second meeting was held on Thursday, when an enormous crowd thronged the long enclosures. According to the official programme the proceedings should have opened with the arrival of a dirigible and an aerial attack on it by a squadron of aeroplanes, but no airship turned up, and the first event was the escape and disappearance of an observation balloon, which was being prepared for destruction later on in the afternoon.

The second item announced was the arrival of a squadron of flying boats from St. Raphael and a combat with two destroyers. One of the flying boats was to have been apparently damaged in the flight and then taken prisoner by a submarine. Repairs were to have been effected, and the machine should have delighted the crowd by making its escape after sinking the submarine. This was timed for 2.15, but no squadron ever turned up, and it was much

later in the day when one solitary flying boat appeared, was tied up to a destroyer, and never managed to get started again up to the time the crowd left. A submarine was cruising around all the afternoon, and aroused more real interest than anything else by occasionally submerging and re-appearing.

Several parachute descents were to take place at various times during the afternoon, but with the exception of one from a kite balloon, which occurred so far over the sea as to be almost indistinguishable, nothing came off until about 6.30 in the evening. In the case of the one mentioned, the parachute took some time to open, but I accept with all due reserve the report in a local paper that the daring aeronaut fell for the space of 22 secs. before the parachute opened, covering 100 metres at a terrific speed!

A good deal of looping and spinning went on at frequent intervals, and there were long intervals in which nothing aviatic took place. One missed sadly the brilliant organisation of our own Air Force Pageant, and the strict adherence to time-table which makes all the difference.

The remaining days of the Aviation Week were devoted to numerous official receptions, luncheons, dinners and dances, with excursions for aviators and their friends to resorts in the neighbouring district. Among others who joined in these proceedings was Paulhan, long retired from active flying, and now engaged in the peaceful pursuit of floriculture in the region near Cannes. Several lectures were also given during the week on aeronautic subjects. The weather on Thursday and Friday broke down, and the sunshine for which the Riviera is noted was conspicuous by its absence, to the great detriment of the joy riding which had been arranged and the open-air charity bazaar at the aerodrome.

EMPIRE AIR SERVICES

The New Airship Scheme

VERY considerable interest has been aroused by the announcement of the scheme for the formation of a company to establish an airship mail and passenger service to India and Australia. At the moment of writing, the decision of the Air Council in the matter has not been made public, consequently it is not known whether this scheme, which calls for no capital investment by the Government, but only a contingent liability in the form of a State guarantee of interest of £91,000 per annum, will mature. The proposal has the backing of Vickers, Ltd., and of the Shell group, and the details of the scheme were explained at a private meeting at Caxton Hall, on March 30, by Commander C. Dennis Burney. Mr. A. H. Ashbolt, Agent-General for Tasmania, who has long been one of the stoutest advocates of Imperial airship services, presided, and Major G. H. Scott explained certain technical considerations. If the scheme meets with Government approval, it will presumably mean that existing airships will not be handed over to the Disposals Board.

Briefly, the scheme submitted by Commander Burney to the Air Ministry is as follows: The company's capital of £4,000,000 would be made up of £1,800,000 in ordinary shares, and £2,200,000 in debentures, subject to the Government arranging, by means of a subsidy, a guarantee of dividend and interest for a period of years. On ordinary shares a 6 per cent. dividend (free of income-tax) would be guaranteed for 10 years, and the debentures would carry 4½ per cent. interest (free of income-tax) until redemption. It is proposed that £1,200,000 ordinary shares and £2,200,000 debentures should be issued forthwith, leaving £600,000 ordinary shares unissued.

Of this share capital, Messrs. Vickers, Ltd., have undertaken to subscribe for 100,000 shares at par and the Shell group for 100,000 ordinary shares or debentures at par. Both companies will give full technical assistance. It is stipulated that the Government shall transfer to the company free of cost all airships, airship material, and airship bases—such as Pulham, Cardington, and Howden, and will supply wireless telegraphy and meteorological services.

The total contingent subsidy per annum in the form of a guarantee of dividend on the ordinary shares and interest on the debentures (on the capital now proposed to be issued) would be:—On £1,200,000 ordinary shares, £72,000 for 10 years; on £2,200,000 debentures, £99,000 until redemption, divided as follows:—British, £91,000 per annum; Australia, £40,000; and India, £40,000. These dividend and interest payments would cease as soon as the profits from the company were sufficient to pay them. It is suggested that no dividend or interest should be payable until the middle of 1923, and accordingly the coming Budgets will be unaffected.

The programme of development would be divided into two stages—(*a*) a bi-weekly service to India; (*b*) an alternate day service to India, with a weekly extension to Australia. Capital would thus be conserved until the necessary experience has been obtained, to render the service efficient on the first stage, before expanding to the second stage. Commander Dennis Burney asks that until time has been given for consideration of this offer no airship or airship material should be broken up or otherwise disposed.

It is estimated that, unless the public take to airship travel very rapidly, there will be a loss on running expenses for the first two years. During this period nothing will be earned to write off depreciation charges, but, on the other hand, experience will give rise to large improvements in the design of airships, and consequently the airships originally constructed by the company will become obsolete with more than normal rapidity. The cost of this will be about £750,000, and it is suggested that when the profits have reached such a figure as to relieve the Government from their guarantee of dividend upon the ordinary shares, and the company can show to the satisfaction of the Treasury that it has established the business on a commercial basis, the Government will refund to the company the £750,000.

Estimates of expenditure and revenue were also submitted. They provide for the building of five new airships (the present fleet will be used for training and for short journeys only). The new ships will be much on the lines of the "LZ125" so far as size is concerned, with a capacity of 3,800,000 cubic ft. On a bi-weekly service to India it is believed that there would be a return of £372,000 per annum, after paying all costs and depreciation charges. Details were also given of a proposed extension to Australia. The sum available for ordinary shares is estimated at £240,000 per annum.

For the first year of full service it has been assumed that receipts will only equal one-third of the running costs, or £130,000 as against a total earning capacity of £1,482,200, and for the second year total receipts of £260,000. It has been further assumed in the computation of dividends that when the service is in full working order yearly earning of £1,037,000, against the total of £1,482,200, will be obtained.

The airships to be used would have a maximum speed of 70 knots, and it is thought that an average speed of 55 knots could be maintained. It is proposed to establish bases with mooring masts *en route*, and allowing six hours at each, the following time-table is estimated:—

Bombay	5½ days	(now 17 days).
Rangoon	7½ ,,	(now 21 to 22 days).
Hong-Kong	8½ ,,	(now 4 to 5 weeks).
Australia	11½ ,,	(now 4 to 5 weeks).

Air Parcels Post Contract

Appointment as exclusive contractors for carrying the Air Parcel Post to Paris has been made by the Postmaster-General in favour of the Instone Air Line, who have installed a machine devoted exclusively to goods. The contract has been secured in open tender.

London Papers on Paris Breakfast Table

WITH this week most of the London papers will be carried by air and will be available in Paris between 9 and 10 a.m., under arrangements made by Messrs. Hachette. Excellent!

Royal Air Force Club

THE Annual General Meeting of the Royal Air Force Club will be held at 5.45 p.m. on Monday, April 24.

Air Mail to Denmark

WE understand that arrangements have been made for inaugurating, this month, an air mail service between Rotterdam and Copenhagen. The company which is to undertake the new service is stated to be Danish, although it is intended to use British machines and pilots. The plan is to have machines leaving Rotterdam in the morning, after the arrival of the night boat from London, and it is expected that they will be able to reach Copenhagen shortly after noon, so that the mails should be distributed early in the afternoon in Copenhagen. In the opposite direction machines will leave Copenhagen at 3 p.m., and will reach Rotterdam in time to connect with the night boat to London. Thus, instead of taking 72 hours, the mails between London and Copenhagen should do the journey in about 24 hours.

THE DESIGN OF A COMMERCIAL AEROPLANE

By CAPTAIN G. DE HAVILLAND.

THERE was a very good attendance to hear the highly interesting and instructive paper, under the above title, read by Capt. de Havilland before the Royal Aeronautical Society, on March 30. Col. O'Gorman was in the chair, and without superflous introduction asked Capt. de Havilland to read his paper. The popularity of the lecturer was demonstrated by the applause which greeted him as he arose to commence the reading of his paper. Although not a very long one, lack of space does not allow of doing more than giving below a summary of the most important points of the paper.

The object of aerial transport, Capt. de Havilland said, was the carrying of passengers and goods by air, from one point to another, in the shortest possible time consistent with safety, comfort and economy. As the type of machine used for this purpose was largely influenced by the type of engine available, it followed that, in the absence of a very high-powered engine, a large machine would necessarily be a multi-engined one. The problem then resolved itself into deciding whether to build a single-engined or a multi-engined machine.

Single-Engine or Twin-Engine ?

Regarding the latter, the lecturer pointed out that the twin-engine machine cost more to build than two single-engined machines using the same engines; that it required larger sheds, and that when out of commission for repairs, it represented a greater loss. Unless the twin-engined machine, he said, was much over-engined—and therefore uneconomical—it could not fly on one engine with full load. The primary object of a twin-engined machine should be its ability to fly on one engine, and the line of development would, therefore, seem to be less weight per h.p., a better arrangement of engine positions, and improvements in the control gear. Such a machine, he thought, could probably not be run economically at the present time, although he thought the multi-engined machine would continue to be developed together with the single-engined type.

The Question of Loading

Having thus indicated the considerations which led one to think that the single-engined machine was the more immediately suitable, Capt. de Havilland narrowed down the problem to a choice between a large slow machine, and a small fast one. The latter, he emphasised, would be of low first cost and economical to run and maintain, and would, provided the high landing speed could be dealt with, and the "get-off" was satisfactory, be a desirable machine in every way. The greatest objection to a high wing loading, and consequently high landing speed, was the long run after touching, but this could easily be reduced, he said, by providing for a large ground angle so that on landing the planes would act as an efficient air brake. Wheel brakes had not proved very satisfactory. As regards landing shocks, these could be dealt with by a good shock-absorbing undercarriage. The lecturer mentioned as an example that at Martlesham a machine which had a ground angle of 17 degrees, and a wing loading of 11.3 lbs./sq. ft. (R.A.F. 15-wing section) gave a pull-up of 163 yds. in a five-mile wind. This machine had flown about 1,200 hrs. and there had never been a mishap which could have been avoided had the landing speed been lower.

As regards the question of "get-off," Capt. de Havilland stated that as a result of numerous tests, and experience of actual service conditions, the limiting "get-off" for fully-loaded machines was that a height of 50 ft. should be reached in 450 yds. from a standing start in a calm. These conditions could be fulfilled by a machine having a light loading and comparatively high weight, but this type had other disadvantages, such as larger shed space, more petrol and oil per mile flow, and greater percentage loss of ground speed in a head wind. Against these must be put the greater carrying capacity of the lightly-loaded machine if designed for the same "get-off."

Capt. de Havilland then pointed out that all the various factors, when balanced out against each other for 1,000 hours' flying, indicated that the passenger mileage is a maximum for a machine having a stalling speed of about 55 m.p.h., while the "all-in" cost per seat per London-Paris trip reaches a minimum for stalling speeds between 58 and 62 m.p.h. The best compromise at the present time would, therefore, seem to be a comparatively small single-engined machine of fairly high wing loading. Such a machine, with an engine of 450 h.p., would carry about 2,000 lbs. of freight at a cruising speed of over 100 m.p.h., with a range of 350 miles. He thought it was an open question whether this machine should be a monoplane or a multiplane, and that only full scale tests could decide the merits of each type. Regarding the monoplane, Capt. de Havilland stated that theoretical estimates indicated that there was only a moderate advantage, aerodynamically, in this type. "It seemed, however," he continued, "that if the aerodynamic qualities were exactly the same as a corresponding biplane, the monoplane construction would be worth while, owing to the smaller surface required and general fewness of parts making for a robust construction. In the preliminary lay-out it was found by integrating the forces on the various sections of the wing that a lift coefficient of about .7 would be obtainable. Later on, wind channel tests showed a distinctly better figure on the tapered wing used, and tests on the complete model demonstrated that the presence of the *fuselage* increased the lift so considerably as to bring the lift coefficient up to .86.

"An estimate of the weight of wing structure showed that it was safe to expect the weight of the monoplane wing to be at any rate no more than the equivalent R.A.F. 15 biplane wing structure with an increase of speed range of about 10 m.p.h. The actual aeroplane has borne out these figures, as the weight of the wing structure is 1,050 lbs., and is equivalent to an R.A.F. 15 biplane structure of 740 sq. ft. loaded to 10½ lbs.

"It has not as yet been possible to get official performance figures, but from the tests carried out at the works, it is evident that there is a general agreement with the wind channel results. The loading with full load will be 17 lbs./sq. ft., most flights have been carried out at 15 lbs./sq. ft., and with this loading the machine lands at about 54 m.p.h. A speed trial at 10,000 ft. with this loading gave 116 m.p.h. Accurate tests are needed to confirm these figures, but it seems evident that the results expected from this wing construction are realised as near as possible, and that this big jump in lift coefficient and consequent reduction of area can be translated from model to full scale without serious error.

"This aeroplane has shown some interesting and difficult features. It was anticipated that the propeller problem would be a difficult one with existing gear ratios. This has been verified in practice, and the need for lower propeller speeds is manifest. Small variations of the disposition of obstructions in the slipstream have a remarkable effect on the performance. The controls also have presented unusual features. The lateral control is very good, but rudder and elevator control are soft, while rudder control when taxi-ing is entirely absent.

"The stability of this type tends to be more marked than the ordinary machines. Among the reasons for this are, doubtless, the facts that it has a larger range of angles of incidence and a smaller downwash than might be expected at slow speeds. Both these factors would tend towards fore and aft stability. Another practical point to be reckoned with is that in a commercial machine the space taken up by the spars in the cabin is rather large, and also the fact that spare wings are not so easily transported as is the case with a biplane. There is no doubt that every considerable increase of lift coefficient will produce difficulties which take some time to surmount. It is now obvious that the cantilever monoplane has very great promise, and it remains to work out the incidental difficulties in order to transform the promise into practical performance."

On the subject of construction, Capt. de Havilland repeated his opinion, expressed at the Air Conference, that for aeroplanes intended to be used in normal climates there was at present little to be gained by metal construction. He called attention to the higher cost of metal, and also to the question of durability, which, he thought, was less for metal when using very thin metal and numerous rivets. For cheapness of construction, and for good wearing qualities, he recommended three-ply wood for the *fuselage*. Metal struts in *fuselage* and wing construction did not generally, he stated, offer any advantages when considering simple and economical construction. The same might be said about wing spars; at any rate so long as it was not possible to standardise and thus make use of special metal sections.

On the question of structural strength, the lecturer expressed himself in favour of a duplication of stressed parts, which could often be carried out without adding a great deal of weight, rather than work on a very high factor of safety for vital members. As an instance, he mentioned the incidence bracing of a biplane, which is usually designed to take the full load of either front or rear truss.

Turning his attention to the subject of controls, the lecturer advocated the extensive use of ball bearings, not only because they made the controls easier to work, but also because they

obviated backlash. He thought that the "sogginess" of a machine, which was often said to be the result of age, and to spoil the performance of a machine, was due to lag in the controls rather than to any actual decrease in performance. In cases where cables must be run around a bend or corner, Capt. de Havilland stated, it had been found satisfactory in practice to run a length of cycle chain over a smooth pulley with a suitable guard. Fitting the control cables outside the *fuselage* facilitated inspection and replacement. While on the subject of lateral control, the lecturer described the special type first tested on the "D.H.29" monoplane, and now incoroporated in the "D.H.34" biplane, the latest type to be constructed for the London-Paris service. This form of control has already been dealt with in FLIGHT, and consists in giving the *ailerons* a differential movement, so that the *aileron* which is moving up moves through a greater angle than does the opposite one, which is, of course, moving down. The result is that the *aileron* in the "up" position forms a balance for that which is in the "down" position. By altering the degree of differential motion, the amount of balance can be adjusted to practically anything required. Capt. de Havilland stated that Mr. A. E. Hagg, of the "D.H." technical department, was largely responsible for this invention.

A commercial aeroplane, the lecturer thought, should have a good degree of stability, so that it could be flown "hands off" under all reasonable conditions. The pilot should then be able to keep right way up when flying in fogs. Suitable turn indicators should enable the pilot to keep his direction, but in conjunction with these he thought it might be an advantage to have a temporary hand-operated rudder control for use in fog conditions.

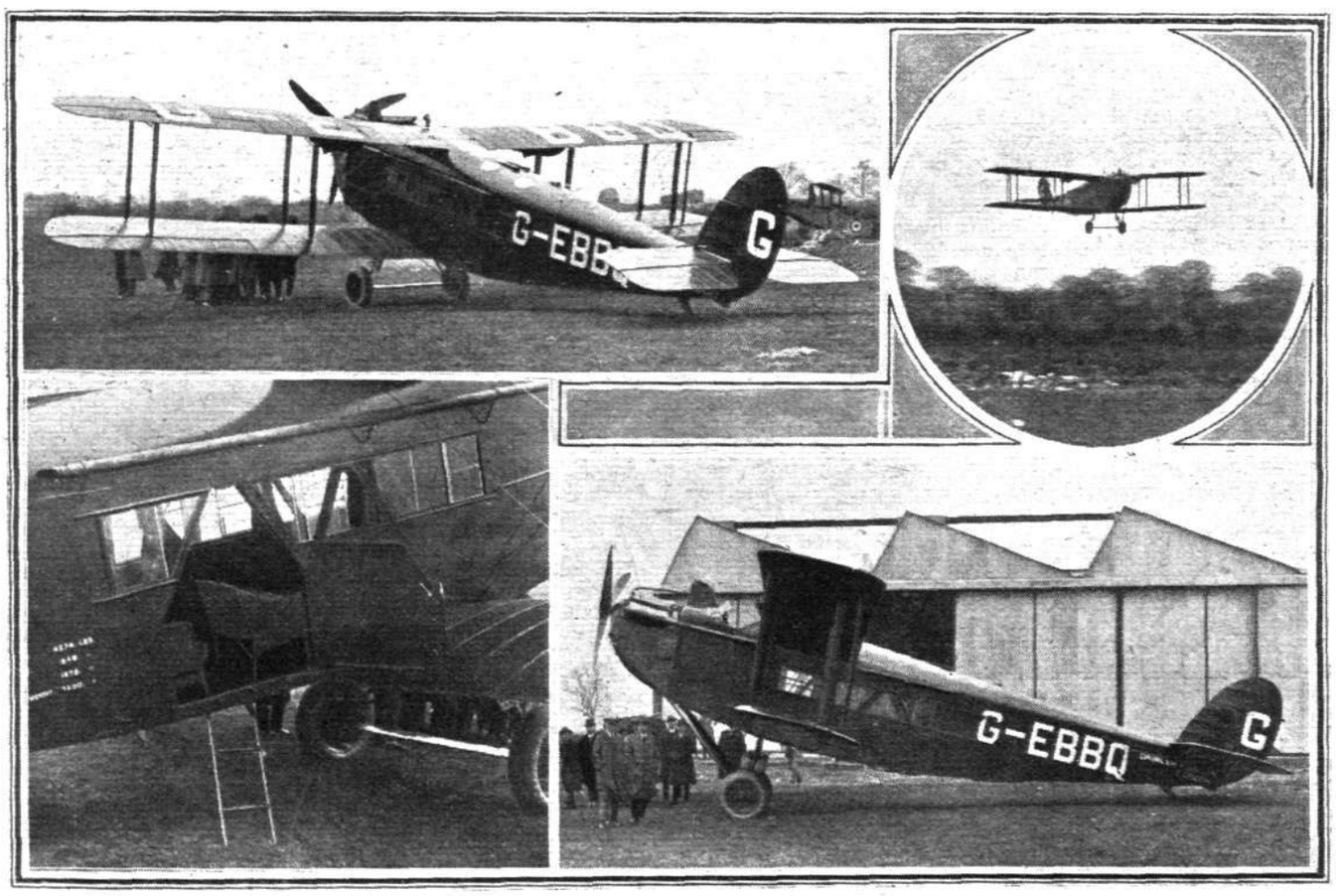
Engine Installation

Capt. de Havilland stated that the detachable engine mounting did not appear to have proved necessary under service conditions, but when machines were run harder, and also during actual construction, it was an advantage. As regards the problem of starting an aero engine, the lecturer thought that a hand barring gear should be satisfactory, provided the ignition and doping systems were improved for starting conditions. Petrol systems of the direct gravity type were the simplest and lightest, but it was not always possible to obtain the necessary "head" with present carburettors. He thought that probably the safest place for petrol tanks was under the top plane, just outside the slipstream. Rubber joints were a source of trouble, but soft steel piping seemed to be reliable, as did also "Petroflex" tubing, which had the advantage of a flexible tubing, and was at the same time durable.

Passenger Accommodation

On the subject of passenger accommodation, Capt. de Havilland expressed himself in favour of the wicker type of seat, arranged along the sides of the cabin, so that all the seats were window seats. With regard to decoration, the weight of this should be carefully watched, as it was quite easy, he stated, to throw away 100 lbs. in paint and varnish, and that this meant a loss of from £5 to £20 per day in load. Ample window lighting was essential, and at least two windows on each side should be made to open. Emergency exits were best arranged near the rearmost portion of the cabin, as this part would be above water in the case of a forced descent. It should not be difficult to silence the engine sufficiently, and the lecturer thought that long exhaust pipes, carried to a point behind the cabin, were the most satisfactory. Heating and ventilation should present no serious difficulties. The luggage compartment was conveniently arranged immediately behind the cabin, with a door in the side of the *fuselage*.

Capt. de Havilland thought that the modern commercial aeroplane would be found to have a much greater durability than generally supposed, putting the life of a machine at three years at least, and probably much longer. This would mean a distance of well over half a million miles. The present mileage flown between engine overhauls, was



FURTHER VIEWS OF THE "D.H.34": Last week we published a description and some illustrations of the new "D.H.34" machine, as built for the Daimler Airway and Instone Air Line. These may now be supplemented by the above photographs, taken on the occasion of the lunch and subsequent visit to the Stag Lane aerodrome. The two larger views show the machine in three-quarter rear and side view, while below is seen the cabin, door, folding ladder, etc. Inset, shows the machine coming in to land.

given by the lecturer as between 15,000 and 20,000 miles, which compared with any type of motor transport.

The chief items of expense as regards maintenance were given as renewal of control cables, replacement of rubber shock absorbers, replacement of wearing parts of petrol pumps, tail skids, and landing-wheel tyres. The lecturer thought that, with the exception of the last named, these troubles had been eliminated, and the use of solid tyres was now, he said, receiving attention. Capt. de Havilland concluded his very interesting paper by stating that "if we leave out of consideration any aerodynamic or structural improvements that will probably appear in the near future, the result of steady development on normal lines gives every reason for an optimistic outlook. With the appearance of larger and lighter engines the cost of passenger or ton mileage will further decrease, and owing to greater reliability the dangers of forced landings will be practically non-existent."

The Discussion

Major F. M. Green said that he would now take the opportunity of replying to Capt. de Havilland, as this opportunity was not afforded at the Air Conference recently. He did not agree on the question of metal construction. It was now possible to build machines of metal which weighed less than wood machines, while probably the cost would not be any higher, might even soon be somewhat lower. He agreed with the lecturer in the matter of twin-engined machines, but thought that three-engined machines would have an advantage, as in case of one engine stopping only about one-third of the power would be lost. He referred to what he termed the "multi-unit" type of engine, on which he was, he said, now working. It consisted in mounting three engines on a common crank case, and gave some promise of good results.

Mr. W. O. Manning did not agree with the lecturer on the question of landing speeds. He thought that experience had shown that low landing speeds formed a sort of insurance against excessive damage, and quoted as proof the old Blériot 28–30 h.p. machines, which landed very slowly, and in which, in spite of many crashes, pilots hardly ever were seriously injured. As soon as the higher-speed 50 h.p. machines came along, which had wings with a smaller camber, crashes began to result in injury, sometimes fatal, to the pilots.

Squadron-Leader Roderic Hill put in a good word for the twin-engined machine, saying that it would enable a pilot to make a flat glide to a landing ground, even if the machine were not capable of flying on one engine. He could not, he said, view with equanimity landing speeds of 62 m.p.h., and thought that, as Mr. Manning had said, low landing speed was an insurance against too much danger. With regard to petrol systems, he pleaded for greater simplicity, saying that it was time we got away from the necessity of a pilot sitting in the cockpit of a machine for three hours, trying to get acquainted with all the different cocks.

Mr. F. Handley Page said he was told that insurance premiums would be considerably lower if landing speeds were kept below 50 m.p.h. He caused much amusement by admitting that to him it seemed that there was only one way to keep down the landing speed (referring, of course, to the H.P. slotted wing), but as this was a scientific society, and not a self-advertising one, he would say no more about that. He agreed with the lecturer that at present wood construction was most suitable. Later on, when we came to build very large machines, metal might be used for preference, much in the same manner, and for similar reasons, that large liners were now built of steel, but small craft, such as motor boats, were nearly always built of wood. Wood machines appeared to stand up well, and he quoted as an example the Fokkers used in Turkey during the War. He understood that the way in which the Fokkers stood up was due to a special secret process of treating the wood, but did not know how much there was in this claim. As regards petrol systems, Mr. Handley Page again amused the audience by saying that what we really wanted was placing the tank very high above the machine, so as to get gravity feed, and then lead the petrol to the engine through 5-inch pipes. There would then be no danger of them choking up. Unfortunately one had to have some form of sky hook to support the tanks, which complicated matters.

Colonel Mayo said that Capt. de Havilland was the pioneer of high landing speed machines, pointing out the big jump in performance which was attained with the introduction of the heavily-loaded "D.H.4." For military machines, that was good, as one was prepared to face the high landing speed for the sake of the better performance. For commercial machines, however, he did not think that the high landing speed was to be accepted. He was surprised at the lecturer's statement about the high landing speed machine having had no accident which could have been avoided had the landing speed been lower. He would like to know how many journeys had to be cancelled owing to the unsuitability of the high speed machines for flying in fogs. As an example of the way in which the slow-landing machine could carry on, he mentioned the Farman "Goliath." This machine, he said, was without doubt fitted with the worst engine in the world, but in spite of this it had an excellent record. He mentioned several instances of this type of machine having made forced landings without serious damage. With regard to petrol systems, Col. Mayo stated that in France gravity feed was almost universal.

Colonel Bristow offered a few criticisms of the inability of the pilot to see on more than one side on some machines, and said that this was very distressing in taking off from an aerodrome with obstacles. The placing of the compass where the pilot could see it easily was another point, and controls should be adjustable so as to be adaptable to different pilots. He thought that the present reliability of our air services and immunity from accidents were due to the extra-ordinary skill and experience of the pilots employed, and that as it was becoming increasingly difficult to get good commercial pilots, we should not lose sight of the fact that it would be an advantage if machines could be so designed as to place a less severe tax on the skill of the pilot. He also referred to highly-loaded machines, and stated that recently one French heavily loaded machine had a forced landing and crashed. The Goliath also had to land, but did not crash.

Colonel O'Gorman before asking the lecturer to reply, said that the discussion had brought out a pronounced difference of opinion as regards high loading *versus* low loading. He thought that high loading was quite all right if the engine was reliable. With regard to the Goliath, he was not speaking from knowledge of the facts, but he very much doubted whether the Goliath got a lower rate of insurance than did the high-load French machines.

Capt. de Havilland stated that he thought that eventually metal construction would be adopted, but not at present, when, he was certain, a metal machine would take three times as long to build. Wood was easy to repair. Incidentally, he had heard of no reason why we should be building metal machines, except for the tropics. He was very glad to hear that Major Green was studying the "multi-unit" type of engine. He said there had been several forced landings with heavily loaded machines, but with a large ground angle they pulled up as quickly as the lightly loaded. In a bad fog, he thought, any machine was dangerous, and he did not think it made any difference whether one was coming into an aerodrone at 50 m.p.h. or at 62 m.p.h. Referring to the Goliath, Capt. de Havilland thought it was a pity that the one which forced-landed in Kent did *not* make a perfectly safe landing. As regards gravity petrol feed, he stated that it had been found that the effect of acceleration in taking off was to double the "head" necessary. Thus, if a certain carburettor was stated to function with a "head" of 2 ft., this was increased to 4 ft. by acceleration.

▣ ▣

Improving the Air Port Services

THE Postmaster-General announces that from April 4 a new dispatch of Air Mail letters was inaugurated by the Post Office between London and Paris. The aeroplane is due to leave Croydon aerodrome at 9.30 a.m. daily. This dispatch is additional to the present service from Croydon at 12.30 p.m., for which letters are accepted at the General Post Office up to 11.10 a.m. daily.

By the use of the new service, letters posted in London too late for the ordinary night mail dispatch to Paris, but in time for the last night collection, will normally be delivered in Paris on the following afternoon, and if they are addressed to places near Paris delivery may be expected in the evening instead of on the second morning following. Letters will be accepted for the 9.30 a.m. aeroplane dispatch at the counter of the General Post Office up to 7.15 a.m.

Letters from the provinces, posted too late for the ordinary mails due for dispatch by the night boat, benefit by the new aeroplane service if they are posted in time for inclusion in mails due to reach the London train terminus by or before 6 a.m.

As regards places at a considerable distance from London, that is, practically all localities except the south and south-east of England, the use of the air service enables the public to postpone the time of posting for France and beyond, by the greater part of the business day.

FLIGHT
AIRCRAFT ENGINEER AND AIRSHIPS

LONDON-PARIS BRITISH AIR SERVICE

LAST week two gatherings for luncheon took place on Tuesday (at the Hotel Cecil) and on Wednesday (at the Criterion)—the first to celebrate the successful completion of the first year's operations of the subsidised British Air Services, the hosts upon this occasion being the Directors of Handley Page Transport, Ltd., and Instone Air Line, Ltd., and the second function to "christen" the new Daimler Air Service, which started on Monday last.

The "H.P."–Instone Meeting

LORD GORELL, Under Secretary of State for Air, occupied the Chair at the Hotel Cecil, and, in proposing "Success to the British Aeronautical Industry," said that the two lines within the last twelve months had done much good by instilling into the public the sense of flying.

Not very long ago, a passenger from London to Paris handed the pilot sixpence on landing at Le Bourget. He welcomed that spirit, because it showed that that passenger, at any rate, had had such a comfortable journey that he thought he was in a taxi. Then there was the case of a lady, who chartered a machine to fly to Harrogate, and on descending there said: "Wait, please." These instances could be multiplied, and they showed that the sense of ordinariness in the air was beginning to dawn on the British public, and when it dawned civil aviation would go right ahead. Messrs. Handley Page Transport, Ltd., and the Instone Air Line, Ltd., who had both been running regular daily cross-Channel services during the past year, had had a good deal to do with inculcating that spirit into the British mind.

In regard to the cross-Channel service, Lord Gorell mentioned that their two hosts would be joined in the next few days by a third firm—the Daimler Company, and he was glad to welcome them.

The two lines from March 19 of last year until the present time had made 526 trips in British machines from London to Paris, and had carried 2,989 passengers, while in the same period 775 trips with French machines had taken 2,043 passengers. In the other direction, from Paris to London, British machines made 524 flights and carried 2,709 passengers, and French machines 787, carrying 2,380 passengers. The totals were: British machines, 1,050, with 5,694 passengers, and French machines, 1,562 with 4,423 passengers.

He had always held that for the ultimate and general development of civil aviation they must look even more to goods than to passengers, but he was afraid that the position in this respect had not been so successful. He had only the figures for the seven months between August, 1921, and February of this year; in that period, the two French firms carried fifty-three tons of goods and the two British firms only sixteen tons. He hoped that in the coming year every effort would be made to change the proportions.

Continuing, Lord Gorell said that in the last week aviation had won a great victory. The Air Ministry had had to battle for its very existence, and had finally come out triumphant. A good sign, he thought, was the more rational interest taken by members of the House in aviation. They had realised what air power meant, and that gave promise that when more was asked for by the Air Ministry there would be a strong section of Parliament which would support them.

Mr. Handley Page, in responding, said he first wished to offer recognition of the great work which Mr. Cogni, their General Manager, had done for the cause of aviation, by his indefatigable zeal in promoting its interests. It was with some satisfaction he could state that his company had flown 70,000 miles with a cost for breakages of only £50. That reflected the security and safety with which the passengers had travelled. Though 10,000 passengers had been carried between London and Paris, they ought to have been carrying more than that number between this country and our Colonies. What he wished to urge upon the authorities was that the lines abroad, the little places we had got to reach eventually, should be thrown open to British enterprise and developed under commercial auspices, rather than as part of a military unit, although he in no way meant to disparage the magnificent work done by the military side. For this purpose, an educational campaign was necessary, and the best education was to have an interior air line in this country. If they could make the air lines prosperous, they would bring in the train of the aircraft industry increased trade between the different parts of the Empire.

Sir Samuel Instone, in proposing "The Air Ministry," said they had arrived at a milestone in aviation. They had just concluded the first period of the subsidy. He congratulated the Air Ministry upon their new lease of life in face of the great campaign to annihilate them. Sir Samuel paid a high compliment to the Chief of their Staff, Capt. Barnard, and said he was pleased to say they had recently added Sir A. Whitten-Brown to their staff, which conveyed an assurance that things would go forward. The Air Ministry's wonderful weather reports had been of the greatest importance to the successful flying, free from accidents and trouble. He welcomed the series of articles of General Groves in *The Times*. He had been able to say what many in high places would have liked to have said, and it had done an immense amount of good. Civil aviation, he thought, would afford an outlet for the young of the coming generation, and therefore it ought to be supported.

Major-General Sir F. Sykes claimed that Civil aviation was the basis of the Air Force. Out of the Channel services they must build up air-routes in various directions abroad, Imperially, and at home.

Mr. Baldwin Raper, M.P., responded for the House of Commons.

Amongst those present were: Sir James Stevenson, Brig.-General P. R. C. Groves, Brig.-General R. K. Bagnall-Wild, Sir H. White-Smith, Lieut.-Col. W. D. Beatty, Colonel Blandy, Sir A. Whitten-Brown, Lieut.-Col. J. Barrett-Lennard, Mr. Theodore Instone, Capt. Alfred Instone, Mr. T. A. Lewis, M.P., Mr. James Paterson, Mr. F. G. L. Bertram, Mr. Arthur Logan, Major S. Greer, Colonel A. Ogilvie, Lieut.-Col. W. A. Bristow, Mr. E. Gamage, Mr. G. E. Howse, Dr. G. C. Simpson, Mr. J. S. Ross, Mr. L. Simon, and Mr. E. Cogni.

The Daimler Airway Inauguration

AT the Criterion, Mr. E. Manville, M.P., presided, the chief guest being Capt. Guest, Secretary of State for Air.

Mr. Manville at the outset referred back to the Air Transport Company's work, with which they had been associated, and the experience then gained against the snags which should help them to create a commercially successful service. First-class organisation stood behind commercial success in civil aviation, and if that idea were carried to its ultimate end it might not be necessary to call upon the Government for the subsidy that was given to approved companies who were unable to make ends meet. Capt. Guest, he said, was somewhat sceptical whether civil aviation could be made self-paying, but he hoped to be able to prove to him that it was possible. The Postmaster-General, who was present, was more than favourably inclined to sending mails by air, and moreover he was well satisfied with the results so far.

Capt. Guest acknowledging the toast, said the Air Ministry welcomed the arrival of the third candidate in the field of competition for air mail and air passenger services. There was a significant factor in connection with the entry into the field of the Daimler Hire Service. It was the first very definite sign of a great motor company turning its attention to aeronautics, and he hoped it would be the fore-runner of the movement in that direction. This was also the first company to have indicated an expectation of carrying on successful air travel without the aid of the subsidy. He had laid himself open to charges of being optimistic about the commercial success of civil aviation, but he thought he had been a little unfairly judged, because such expressions as he had made use of must be taken with their corollary. Although in England, through want of space, the weather conditions, the excessive comfort and speed of other forms of transport, civil aviation had apparently not become popular, yet as a corollary it was none the less necessary that the British Isles should be the pioneers of a wider form of civil aviation than these islands offered to us. We were merely the heart of a great Empire which had great stretches of country, which were unbridgeable except by air, and he had always supported the cross-Channel services and the subsidies attendant thereto, because it was there, under the most difficult conditions, that we could establish and develop our ability in civil aviation, and transport it—organisation and all—to other parts of the Empire in order to reach the desirable acme of success which was the Imperial air communications. There were openings already at hand. A greater conception was to have a route straight through Europe to Constantinople, to Baghdad, to Busra, and to India at Karachi. It was early yet to do more than outline such a possibility, but most of the links in that chain were already covered and undertaken by someone, and it seemed that the time would not be far distant before we got started on that great route.

He wished to repudiate the charge that was sometimes expressed to the effect that civil aviation was "snowed under" in the Air Ministry by Service considerations. This would certainly not be so while he was at the Air Ministry, but he

thought people ought to appreciate the relative responsibilities of the two sides of the work. The fact that they had had to devote the last three years to the formation of a service, had no doubt somewhat over-occupied their time, but without that service they would be as dissatisfied as they could be as citizens of this great country, and therefore when they heard or read unsupported attacks upon the Ministry in that connection, they should take the broadest possible view of the necessity for the whole service being built up in this country, and being put into a position of sufficient security to keep pace with developments in any other land. He did not suppose anyone believed in the subsidy as a permanent doctrine, but during the stages of infancy it was essential that the State should come to the rescue and assist in the best way it could. He looked forward to the time when civil aviation would not need this artificial support, but so long as the period of suspense remained there would be no stronger advocate than himself of the system of subsidies in this connection.

Mr. F. G. Kellaway, the Postmaster-General, said he admired the audacity of the entry into aviation of the Daimler Hire Co. If the air services could give him good terms for carrying his goods those goods would be at their disposal. The three considerations necessary to the successful carrying of mails were speed, cheapness, and reliability, and the most important of all was reliability. The outlook now was brighter than it had been at any time since 1919. He did not know how far the technical men had got towards solving the problem of night flying, but that was one of the difficulties that stood in the way of a very considerable use of the air services for carrying mails between England and Paris. The London business man could post a letter tonight, and have it delivered in Paris next morning, and until the air services could fly at night they would not beat that. He hoped that during this year the mails would be carried to Brussels by air, and that the service would be extended through Brussels to Germany. For the conveyance of air mails to Amsterdam, they were again relying on the services of the Royal Dutch Air Co. He was now in communication with the French Post Office regarding mails from Paris to Prague, Vienna, and Budapest, but the outstanding examples of what could be done in carrying mails by air was the Cairo-Baghdad service. The ordinary mails going from this country to Baghdad took twenty-seven days, but the Air Ministry was carrying them in ten to nine days, and they hoped this year to reduce it to eight. The extent to which that service was used was remarkable, for he was informed that something like 45 per cent. of the letters sent between this country and Baghdad were sent by air. If the Air Ministry, or any of the civil aviation companies could guarantee cheap, swift, and reliable communication, he, as Postmaster-General, and the Post Office as a whole, would be only too glad to use the whole of their organisation to place in their hands for transport the largest quantity of letters and parcels which they could possible carry. He saw no practical difficulty in the way of having an air service which would enable letters posted in London today to be delivered in Australia within a week's time. If that could be done, think not only of its commercial advantages, but of the extent to which it would make all the peoples of this Empire one great family. It would be a case of audacity overcoming insuperable difficulties.

Col. Frank Searle, the Managing Director of Daimler Hire, Ltd., said they had built up their business upon service to the public—value for money—and they intended to follow upon the same principle with the Airway. He thought the Paris-London service could be now run with the subsidy, but he hoped in a year to give figures that would prove the service could be run without a subsidy. Once they could prove they could work at a profit, they would be prepared to go anywhere with a full service. He maintained that the expense for business people in travelling by air to Paris and back in the day was less than by the pre-historic methods by train and boat, absorbing two days, at least, with all its extra expenses. He wanted the agencies to look after the airway more individually and encouragingly than they had done. Col. Searle then paid a high tribute to Messrs. Napiers, the engine manufacturers, who were giving an immense amount of help to the companies who were operating, and also to Capt. de Havilland, who designed the machines. He was most sympathetic and receptive of suggestions of a practical (not engineering) nature, and had as far as possible, embodied them in his machines.

Amongst those present were: The Duke of Sutherland, Lord Gorell (Under Secretary for Air), Major-General Sir F. Sykes (Controller-General of Civil Aviation), Sir J. Norton Griffiths, M.P., Sir H. White-Smith, General Sir H. C. Z. Holden, Colonel Grant Morden, M.P., Colonel O. C. Armstrong (President, Federation of British Industries), Brig.-General Sir W. T. F. Horwood, Sir Halliwelle Rogers, Brig.-General P. R. C. Groves, Sir A. J. Hobson, Mr. P. J. Hannan, M.P., Major-General Sir W. S. Brancker, Brig.-General R. K. Bagnall-Wild, Mr. F. Handley Page, Captain de Havilland, Lieut.-Col. W. D. Raikes, Sir Samuel Instone, Lieut.-Col. Mervyn O'Gorman, Lieut.-Col. Heckstall Smith, Lieut.-Col. W. D. Beatty, and Commander F. B. Armstrong.

THE LONDON AERO-MODELS ASSOCIATION

THE Propeller Competition held on March 25 proved popular, there being fifteen entrants.

The judges were kept busy testing up to 10.30, and had to continue on the following Tuesday, to complete their task.

The first prize was won by Mr. W. E. Evans, second by Mr. L. Lansdown, third by Mr. F. de P. Green. Mr. F. J. Camm will give full data of the competition in due course.

Re Competition No. 2, for R.O.G. duration. Models limited to 4 ozs. minimum. No other restrictions. To be held on Wormwood Scrubbs, Sunday, April 16, at 11 a.m. (The word " minimum " was omitted in error in the announcement of March 23).

On Thursday, the 6th inst., Mr. W. E. Evans will give a short lecture on " How to Design a Model Aeroplane Propeller."

The Secretary has been requested to draw members' attention to General Rule No. 3.

Meetings are held every Thursday at 20, Great Windmill Street, Piccadilly, W. 1, at 7.30 p.m., when full particulars of membership can be obtained.—Hon. Sec., A. E. Jones.

NEW COMPANY REGISTERED.

AEROMOTORS, LTD.—Capital £900 in £1 shares (300 " A " and 600 " B "). Aeronautical and general engineers. Permanent directors: W. Harris, D. F. H. Fitzmaurice. Solicitors: Wedlake, Letts and Birds, 11, Serjeants' Inn, E.C. 4.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: cyl. = cylinder; I.C. = internal combustion; m. = motors

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1920

Published April 6, 1922

25,812. B. J. DEMOCRATIS. Parachutes. (176,406.)

30,725. ARMSTRONG SIDDELEY MOTORS, LTD., J. LLOYD and H. N. WYLIE. Means for securing metal tubes in sockets. (176,432.)

31,712. R. VERDUZIO and U. SAVOIA. Aeroplane wing bracing. (153,595.)

33,316. H. E. S. HOLT. Holt landing lights or flares for attaching to aircraft. (176,455.)

34,819. P. W. SCHOLLAR and E. R. CALTHROP'S AERIAL PATENTS, LTD. Parachute launching devices. (176,518.)

36,475. D. J. MOONEY and E. E. BROWN. All-metal aeroplane wings. (176,565.)

APPLIED FOR IN 1921

Published April 6, 1922

1,167. ZEPPELIN-WERKE GES. Fastening for radiators for aircraft. (157,272.)

5,028. H. BEDNALL. Head-gear for use on aircraft. (176,638.)

6,644. M. KAPFERER. Wheels. (160,460.)

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

Telegraphic address: Truditur, Westcent, London.
Telephone: Gerrard 1828.

SUBSCRIPTION RATES

" FLIGHT " *will be forwarded, post free, at the following rates :—*

UNITED KINGDOM			ABROAD*		
	s.	d.		s.	d.
3 Months, Post Free...	7	7	3 Months, Post Free...	8	3
6 " " ...	15	2	6 " " ...	16	6
12 " " ...	30	4	12 " " ...	33	0

These rates are subject to any alteration found necessary under abnormal conditions and to increases in postage rates.

** European subscriptions must be remitted in British currency*

Cheques and Post Office Orders should be made payable to the Proprietors of " FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.